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BETARU: An Indigenously Designed Cordless Stethoscope

Despite being a very useful instrument, a conventional stethoscope does have limitations. Auscultating a child in a teaching environment invariably ends up in the child crying by the time the 6th or 7th student examines the child (a problem I came across during my 3rd year MBBS posting in Pediatrics). I therefore developed an indigenous cordless stethoscope (Betaru) to overcome this limitation (*Fig. 1*).

Betaru generates electrical signals enabling a wide spectrum of applications. It represents an advanced stethoscope with enhanced features like volume control and amplification, sound filteration circuits, internet transferable signals, signal recording and assessment facility and a portable cordless phonocardiogram.

Betaru was constructed using FM signals, transmitter, receiver and various amplifying and filtering units. It utilizes the standard type of a chest piece, allowing rotation to the bell/ diaphragm position, like a conventional stethoscope. The transmitting unit weighs 70 grams and can be easily gripped in one hand. The Receiving unit is 200 grams which can be clipped onto any pocket or placed along with the head phones. The total manufacturing cost is around Rs. 5000/- with each head set for Rs. 2500/- (excluding research, development and other costs).

The important advantages of Betaru are: (*i*) It is small, compact, handy and cordless giving greater ease and mobility to a doctor; (*ii*) Signals can be stored on a computer or other

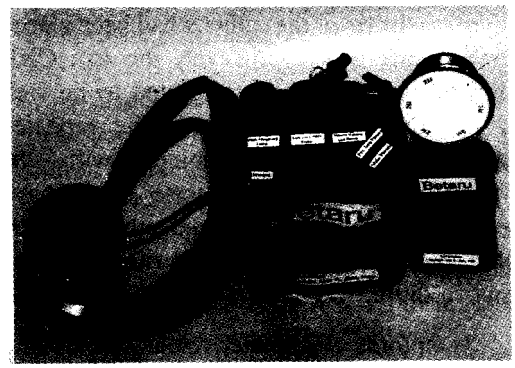

Fig 1. Photograph of the indigenously developed cordless stethoscope. On the left are the headphones, in the middle is the receiving unit and on the right is the transmitting unit.

media for later reference; (*iii*) It is better audible in conditions where auscultatory findings are not of a good amplitude (pericardial effusion, fetal heart sounds, fine crepts, obesity); (*iv*) Simultaneous auscultation can be performed by several individuals with separate headphones; (*v*) Signals can be transmitted via telephone lines or internet providing the opportunity of tele medicine; and (*vi*) Signals can be analyzed by passing through an A/D converter, thus digitizing them. Subsequently, a fourier analysis can document any abnormal frequencies in auscultatory findings, helping in disease diagnosis. An on-line visual display of auscultatory findings is also possible.

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Management of Beta Thalassemia

I read the recent article(1) on this subject with interest. In this connection I seek the following clarifications:

1. What is the most appropriate time to measure pre-transfusion and post-transfusion Hb in relation to that particular blood transfusion?
2. Regarding vaccination–

(*a*) Please specifically explain the effect of regular transfusion of adult blood (usually begins around 6 months of age and at recommended 3 weekly intervals) on measles vaccination. It has been stated previously that measles and MMR vaccine should be given at least 6 months after exchange transfusion(2).

(*b*) What is the role of vaccination against pneumococcus, *H. influenzae* b and meningococcus after splenectomy?

(*c*) Key messages opined that Hepatitis B vaccination should begin before start of transfusion therapy(1). In our country many parents including those of thalassemia children opt costly vaccination at later age and may not complete the vaccination as per schedule. Does this problem has any adverse effect on seroconversion in beta-thalassemia?

3. It was suggested that folic acid 5 mg per week be given while another article(3) favoured 2.5-5 mgm folic acid per day. What is better-per week or per day supplementation?
4. Is it possible to diagnose thalassemia major before 6 months of age without antenatal screening when the characteristic picture of worsening anemia with hepatosplenomegaly is not full blown but there is history of an affected sibling? Can hematological criteria be as useful in this age group as in older infants?

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